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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,403	05/18/2005	Nobuo Kobayashi	123928	5897

25944 7590 03/27/2007

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EXAMINER	
RODELA, EDUARDO A	
ART UNIT	PAPER NUMBER
2826	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/535,403	KOBAYASHI, NOBUO	
	Examiner	Art Unit	
	Eduardo A. Rodela	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Minhloan Tran
Primary Examiner
Art Unit 2826

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the reply filed December 27, 2007.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bai et al. (US 2004/0222412).

Regarding claim 1, Bai shows (e.g. Figure 1), a field-effect transistor comprising:

a gate electrode [14] formed at one side a base substrate [12];

a source electrode [22] formed at the one side of the base substrate [12];

a drain electrode [24] formed at the one side of the base substrate [12];

an insulation layer [16] formed between the gate electrode [14] and the source electrode [22] and between the gate electrode [14] and the drain electrode [24];

a semiconductor layer [20] formed around the source electrode [22] and the drain electrode [24]; and

a functional layer [18, called a "surface modifying film" paragraphs 0080-0082, where US application serial number 10/012,654 is incorporated as part of the

specification, in US application serial number 10/012,654, which is US 2003/0102471 Kelley et al., the surface modifying film or "polymeric layer interposed between a gate dielectric and an organic semiconductor layer" paragraph 0006, which is for example of a material "polyfluorene" as shown in paragraph 0051] provided so as to come into contact with the semiconductor layer [20] and containing electron acceptors, said functional layer [18] being arranged between said semiconductor layer [20] and said insulating layer [16],

wherein electron acceptor is a pi-conjugate molecule [as shown earlier polymeric layer is to contain "polyfluorene"] composed of a pi-conjugate structure whose carbon number is 3 to 15 to which at least one group of -Cl, -Br, -I [paragraph 0035 of Kelley], and =O [paragraph 0035 of Kelley] is linked. Although Bai (and Kelley which is incorporated by reference therein) does not explicitly state that the layer between the semiconductor layer and the dielectric layer is a pi-conjugate material, it is known in the art that polyfluorene is a pi-conjugate material, as shown in Nishizawa et al. (US 5,355,235) that polyfluorene is an example of a pi-conjugated polymer [see column 4: lines 1-5, "Examples of the pi-conjugated polymer are...polyfluorene"]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used polyfluorene as a possible pi-conjugated material in the invention of Bai, in order to provide a material which is known to enhance the performance characteristics of an organic thin film transistor.

Regarding claim 2, Bai shows the field-effect transistor according claim 1. In addition, Bai shows wherein the electron acceptor has a half-wave reduction potential -

0.46 V or higher [paragraph 0035 or Kelley which is incorporated into the specification of Bai, shows the electron acceptors as halogens, which satisfy the specified limitation].

Regarding claim 4, Bai shows the field-effect transistor according to claim 1. In addition, Bai shows the organic layer constituent details wherein the pi-conjugate structure has a carbon number of 3- to 15 and in which a heterocycle including an S atom as a heteroatom is formed [paragraph 0035 or Kelley which is incorporated into the specification of Bai].

Regarding claim 5, Bai shows the field effect transistor according to claim 1. Bai shows wherein the functional layer has a thickness from about .5-500 nm [paragraph 0084 of Bai].

Regarding claim 6, Bai shows the field effect transistor according to claim 1. Bai also shows the dimension for the insulating layer [16 to be in the range of 500-5000 Angstroms or 50-500 nanometers, in paragraph 0044] and the functional layer [18 to be in the range of 5-400 Angstroms or .5-40 nanometers, in paragraph 0084], wherein the functional layer satisfies the following expression (1); D2 * 0.001 =< d1 =< d2 * 1 ... (1), Where d1 denotes the thickness of the insulation layer. Bai et al. does disclose dimensions wherein the functional layer satisfies the following expression (1); D2 * 0.001 =< d1 =< d2 * 1 ... (1), Where d1 denotes the thickness of the insulation layer [So if one were to chose d1 of layer 18 to be 5 Angstroms or .5 nanometers, and d2 to be 5000 Angstroms or 500 nanometers, these numbers would satisfy the equation, 5 Angstroms or 0.5 nanometers =< (5 Angstroms or 0.5 nanometers) =< 5000 Angstroms or 500 nanometers].

Regarding claim 7, Bai shows (e.g. Figure 1) a field-effect transistor comprising:

a gate electrode [14] formed at one side a base substrate [12];

a source electrode [22] formed at the one side of the base substrate [12];

a drain electrode [24] formed at the one side of the base substrate [12];

an insulation layer [16] formed between the gate electrode [14] and the source electrode [22] and between the gate electrode [14] and the drain electrode [24];

a semiconductor layer [20] formed around the source electrode [22] and the drain electrode [24]; and

a functional layer [18, called a "surface modifying film" paragraphs 0080-0082, where US application serial number 10/012,654 is incorporated as part of the specification, in US application serial number 10/012,654, which is US 2003/0102471 Kelley et al., the surface modifying film or "polymeric layer interposed between a gate dielectric and an organic semiconductor layer" paragraph 0006, which is for example of a material "polyfluorene" as shown in paragraph 0051] provided so as to come into contact with the semiconductor layer [20] and containing electron acceptors [shown by Kelley 2003/0102471 to be incorporated by reference, shows polyfluorene as polymer between channel layer and dielectric layer], wherein the concentration of the electron acceptors contained in the functional layer is 0.01 to 10 mass percent [In the examples of processing the polymeric interface between the dielectric and the organic semiconductor layer, it is shown that the polymeric material is deposited in a wt % of 0.1 of the polymer is applied to the wafer, for example in Example 11, paragraph 0097, "A 0.1 wt % solution of the polymer in toluene was applied to wafer...pentacene was

applied", which shows the application of the polymer layer, then the semiconductor layer], and the electron acceptors are pi-conjugated molecules [shown to be polyfluorene by Kelley which is incorporated by reference in Bai]. Although Bai (and Kelley which is incorporated by reference therein) does not explicitly state that the layer between the semiconductor layer and the dielectric layer is a pi-conjugate material, it is known in the art that polyfluorene is a pi-conjugate material, as shown in Nishizawa et al. (US 5,355,235) that polyfluorene is an example of a pi-conjugated polymer [see column 4: lines 1-5, "Examples of the pi-conjugated polymer are...polyfluorene"]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used polyfluorene as a possible pi-conjugated material in the invention of Bai, in order to provide a material which is known to enhance the performance characteristics of an organic thin film transistor. Bai (and Kelley incorporated therein) does not specifically state that polyfluorene is in a concentration of 0.01 to 10 mass percent in the polymer, but does show several examples of different materials used in the functional layer to be present in a 0.01 wt percent concentration [In the examples of processing the polymeric interface between the dielectric and the organic semiconductor layer, it is shown that the polymeric material is deposited in a wt % of 0.1 of the polymer is applied to the wafer, for example in Example 11, paragraph 0097, "A 0.1 wt % solution of the polymer in toluene was applied to wafer...pentacene was applied", which shows the application of the polymer layer, then the semiconductor layer]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a concentration of 0.01 to 10 mass percent of the

electron acceptors in the invention of Bai in order to have the necessary concentration ratio to allow for increasing the device performance characteristics.

Response to Arguments

Applicant's arguments with respect to the rejection(s) of claim(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Bai et al.

Fax / Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo A. Rodela whose telephone number is (571) 272-8797. The examiner can normally be reached on M-F, 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Eduardo Rodela
Examiner

E.R.